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THE PROGRESSIVE GROWTH OF THE DERMOID COAT OF THE MEMBRANA TYMPANI.¹

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THE fact of a progressive movement of the dermoid lining of the external auditory canal and of the outer coat of the membrana tympani in its process of growth is sufficiently well recognized, and any value which this communication may possess lies in its attempt to more accurately define the character or direction of this movement. The importance of a process which shall not only rapidly repair a tissue in active service as part of a structure constantly exercised in vibration in the transmission of sound, but shall also provide for the uniform removal of all effete tissue, is evident. That this is accomplished by a movement, superficially, of the lining of the external auditory canal, from within outward, has been remarked by several writers, and is a matter of daily observation among aurists, and that this movement includes also the outer superficial coat of the membrana tympani is well known; but, so far as I am aware, no attempt has been made to map out the direction of this movement in the manner herewith described.

The application of paper disks to cover small perforations of the membrana tympani, as described in a paper read by the writer at the meeting of the First International Otological Congress in New York in 1876, led to the observation that these disks, instead of finally detaching themselves and falling off, followed a more or less definite course, which brought them, at the end of a period varying from one to three weeks, to the periphery of the membrane, and eventually to some point on the wall of the canal, whence, when removed by means of the forceps, they brought away, firmly adherent to them usually, a thin film of epidermis.

¹ Read at the Annual Meeting of the American Association for the Advancement of Science. Section F. Montreal, August, 1882.



This observation, frequently repeated, led to a series of experiments, now extending over a period of about five years, upon the healthy membrana tympani, and of which the diagram herewith presented represents, as it were, briefly, the summary of results.



The observations were conducted as follows: Small disks, of about the size represented in the diagram, were cut from thin, double-sized foreign post or note paper, dipped in water, caught one at a time upon the end of a fine cotton-tipped bent wire probe (care being taken not to touch them with the fingers on account of removing the sizing), carried into the ear under good illumination, and successively brought into contact with the membrana tympani, to which they immediately and firmly adhered, the warmth of the surface quickly setting the sizing, in the several positions, as nearly as was possible in each case, indicated in the diagram. At intervals of from two to five days the ear was examined, and the movement of each disk recorded on a drawing, the cumulative results of a large number of such drawings being here represented.

The disks placed just posteriorly to the malleus usually made a nearly straight line toward the posterior superior periphery of the membrane, their lines of movement coinciding after they had passed the periphery and reached a point varying from two to five millimetres distant from the periphery, upon the wall of the canal. The disk placed at the tip of the malleus described a slight curve, and followed the line of its predecessors, but without overtaking them, being usually from one to three days longer in reaching the periphery.

The third disk, placed in front of the tip of the malleus, instead of reaching the periphery by the shortest route, described, in the great majority of the cases, after what appeared to be a period of hesitation, a still larger curve, and made its way also toward the posterior superior periphery, from three to five or more days in the rear of the first disk. The disk placed in front of the malleus about half way between the tip of the manubrium and the short process made its way, more slowly than the others, however, in a nearly straight line toward the anterior superior periphery, where, once arrived, it

either continued directly outward along the superior wall of the canal, finally trending, however, slightly toward the posterior wall, or described the curve indicated in the diagram, passing over the superior border of the membrane of Shrapnell; as the majority, though a very small one, of the disks placed in front of the malleus, chose this latter course, it is so represented here.

From these observations it would seem that the most rapid clearing away, so to speak, of the dermoid coat of the membrana tympani occurs in that portion of the membrane the integrity of which is most important to its function of vibration with the malleus, and that the most vigorous progressive outward movement of the lining of the canal occurs in the same line.

In following the course of the paper disks along the canal, moreover, it is found that from the posterior superior periphery of the membrana tympani outward they describe a curve coming downward upon the posterior, and even upon the posterior inferior wall of the canal, by the time that they have reached a point corresponding to the junction of the osseous and cartilaginous portions of the canal, at which point their further outward progress is usually terminated by the separation of the thin epidermal layer from the surface beneath.

This simple experiment is so easily made that I hope that the observation will be repeated by others, to the end of either confirming or correcting the results here briefly given.

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